Remarks

Claims 9 - 20 are pending in this application. By this Amendment, claims 9 and 18 are amended. The specification has been amended to correct a minor grammatical error. No new matter has been added. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

The Examiner has requested a list of copending applications that set forth similar subject matter. Application calls the attention of the Examiner to application numbers 08/511076, 09/197278, 09/666866, 09/934178, 09/878596 and 10/194854. The pending claims of these applications are submitted herewith. Applicant also calls to the attention of the Examiner US 6348065, the issued claims of which are submitted herewith. Finally, Applicant calls to the attention of the Examiner US 08/396569 which is abandoned.

A copy of the claims of each above-listed application is attached to this response.

Claim Rejections - 35 USC § 112, first paragraph

The Office Action rejects claims 9 - 20 under 35 USC § 112, first paragraph. Base claims 9 and 18 have been amended. Support for the claim amendments may be found in the Figures, and in the specification at least at page 3, line 28 – page 4, line 20. Applicants believe that it is clear from the language of claims 9 and 18 that an unexpanded state of the claimed stent does not occur simultaneously with an expanded state, and that claims 9 – 20 overcome the rejection under 35 USC § 112, first paragraph. Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 USC § 112, second paragraph

The Office Action rejects claims 9 - 20 under 35 USC § 112, second paragraph, stating that in claims 9 and 18, there is no antecedent basis in the specification for the language "forming a path about the periphery of the stent which has a shorter total length as compared to the total length of a pathway about the periphery of the stent formed by the second type of set of strut members." This rejection is respectfully traversed. Applicants assert that the existence of a path about the periphery of the stent formed by a set of strut members is an inherent feature of the Figures.

By disclosing in a patent application a device that inherently performs a function

or has a property, operates according to a theory or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it. The application may later be amended to recite the function, theory or advantage without introducing prohibited new matter. *In re Reynolds*, 443 F.2d 384, 170 USPQ 94 (CCPA 1971); *In re Smythe*, 480 F. 2d 1376, 178 USPQ 279 (CCPA 1973).

Claim 9 recites "...set of strut members forming a closed structure which extends about the periphery of the stent..." Similarly, claim 18 recites "...set of strut members forming a serpentine closed structure which extends about the periphery of the stent..." A person of ordinary skill in the art would understand that a peripheral path around a strut member set inherently and necessarily exists in the stents shown in Figs. 1 - 4, and that the total length of such a path around a first type of strut member set will vary from the total length of a path around a second type of strut member set where the struts of the first set differ in length from the struts in the second set. Stated differently, it is inherent that the pathway traversed by the endmost band is greater than that traversed by the shorter bands. Therefore, Applicants respectfully request the withdrawal of the rejection.

The Office Action also rejects claims 9 - 20 under 35 USC § 112, second paragraph as being indefinite. The Examiner acknowledges that the stent may exist in both unexpanded and expanded states, but states that "it is unclear which of these two states is being claimed." This rejection is respectfully traversed. Applicants assert that claims 9 – 20 are directed to any stent meeting the claim limitations, regardless of whether the stent is in an expanded state or an unexpanded state. Further, Applicants believe that amendments made to base claims 9 and 18 obviate the rejection under 35 USC § 112, second paragraph.

Accordingly, Applicants request withdrawal of the rejections of claims 9 - 20 under 35 USC § 112, first and second paragraphs.

Claim Rejections – 35 U.S.C. § 102

The Office Action rejects, under 35 USC § 102(e), claims 9 - 20 over Kleshinski et al. (U.S. Patent No. 5,902,317).

Assuming, for the sake of argument, that Kleshinski et al. discloses or suggests the presence of two sets of struts of different total path lengths, Kleshinksi does not disclose or suggest the presence of two different types of sets of struts where the struts, in the unexpanded state of the stent, are both parallel to the longitudinal axis of the stent and equidistant from

adjacent struts to which they are connected, as required by claim 9 and claims dependent therefrom. Kleshinksi also does not disclose or suggest the presence of two different types of sets of struts where each strut in the two different sets is connected at a first end to one adjacent strut via a curved end segment and at a second end to another adjacent strut via another curved end segment, where the curved end segments are of the same length, as recited in independent claim 18 and claims dependent therefrom.

Therefore, independent claims 9 and 18 are not anticipated by Kleshinski et al. Claims 10 – 17 and claims 19 and 20 depend from independent claims 9 and 18, respectively, and therefore are also not anticipated. Accordingly, Applicants request the withdrawal of the 35 USC § 102(e) rejection.

The Office Action also rejects, under 35 USC § 102(b), claims 18 and 20 over Cardon et al. (U.S. Patent No. 5,383,892).

Applicants assert that Cardon et al. do not disclose or suggest a stent formed from a single piece of material, as recited in independent claim 18. Cardon et al. disclose a stent formed from at least three separate cylindrical parts that are welded together, wherein at least two parts are axially rigid and at least one part is axially flexible (see Figs. 1 – 4, col. 2, lines 25 – 59, and claim 1).

As such, independent claim 18 and claim 20 dependent therefrom are patentable over Cardon. Accordingly, Applicants respectfully request the withdrawal of the rejection under 35 USC § 102(b).

Conclusion

Based on at least the foregoing amendments and remarks, Applicants respectfully submit this application is in condition for allowance. Favorable consideration and prompt allowance of claims 9 - 20 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

The Commissioner is hereby authorized to deduct any additional fees arising as a result of this Amendment or any other communication from or to credit any overpayments to Deposit Account No. 22-0350.

Respectfully submitted,

VIDAS, ARRETT & STEINKRAUS

Date: March 28, 2003

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Version with markings to show changes made

In the specification:

Paragraph beginning at page 3, line 21:

Turning to the Figures, Figure 1 and Figure 2 show a fragmentary flat view of an unexpanded stent configuration and the actual tubular stent (unexpanded), respectively. That is, the stent is shown for clarity in Figure 1 in the flat and may be made from a flat pattern 10 (Figure 1) which is formed into a tubular shape by rolling the pattern so as to bring edges 12 and 14 together (Figure 1). The edges may then **be** joined as by welding or the like to provide a configuration such as that shown in Figure 2.

In the claims:

9. (Twice Amended) A [thin-walled,] cylindrical stent formed from a single piece of metal, **[the stent having a nominal diameter when fully radially deployed into a vessel of the human body and having a longitudinal direction parallel to the axial axis of the cylindrical stent,]** the stent **[further]** comprising a multiplicity of sets of strut members with each set of strut members forming a closed structure which extends about the periphery of the stent, the closed structure comprised of **[longitudinally aligned]** **interconnected** strut members**, each strut member connected at a first end to an adjacent strut member and at a second end to another adjacent strut member, in an unexpanded state of the stent each strut member being parallel to the longitudinal axis of the stent and equidistant from adjacent strut members to which it is connected,** adjacent sets of strut members being coupled each to the other by connectors, said stent having a proximal end, a distal end and a center section located approximately half-way between said proximal and distal ends, said stent having two types of circumferentially extending sets of strut members, a first type of set of strut members and a second type of set of strut members, the first type of set of strut members forming a path about the periphery of the stent which has a shorter total length as compared to the total length of a pathway about the periphery of the stent formed by the second type of set of strut members, the stent when **[radially deployed to its nominal diameter]** **expanded having a uniform diameter and** having the first type of set of strut members having greater radial rigidity as compared to the second type of set of strut members.

18. (Twice Amended) A stent **formed from a single piece of material** **[having a nominal diameter when fully radially deployed into a vessel of the human body and having a longitudinal direction parallel to the axial axis of the stent]**, the stent **[further]** comprising a multiplicity of sets of strut members with each set of strut members forming a serpentine closed structure which extends about the periphery of the stent, the closed structure comprised of **[longitudinally aligned]** strut members, **each strut member connected at a first end to one adjacent strut via a curved end segment and at a second end to another adjacent strut via another curved end segment, the curved end segments being of the same length,** adjacent sets of strut members being coupled each to the other by connectors, said stent having a proximal end, a distal end and a center section located approximately half-way between said proximal and distal ends, said stent having two types of circumferentially extending sets of strut members, a first type of set of strut members and a second type of set of strut members, the first type of set of strut members forming a path about the periphery of the stent which has a shorter total length as compared to the total length of a pathway about the periphery of the stent formed by the second type of set of strut members, the stent when **[radially deployed to its nominal diameter]** **expanded having a uniform diameter and** having the first type of set of strut members having greater radial rigidity as compared to the second type of set of strut members.

Claims of Related Copending Applications

08/511076, 09/197278, 09/666866, 09/878596, 09/934,178, U.S. 6,348,065 and 10/194,854

Pending claims from 08/511,076.

1. A tubular, flexible, expandable stent having a proximal end and a distal end and comprising:

a plurality of cylindrical shaped segments aligned on a common longitudinal axis to define a generally tubular stent body, each segment being defined by an undulating pattern of interconnected struts to define the periphery of the stent body, circumferentially adjacent struts interconnected at only one end of the struts; and

a plurality of interconnecting elements, each interconnecting element extending from an interconnected end of adjacent struts on one segment to a circumferentially offset interconnected end of adjacent struts on an adjacent segment, each interconnecting element having a proximal end and a distal end, the distal end circumferentially and longitudinally offset from the proximal end, the interconnecting elements oriented non-parallel to the common longitudinal axis;

the stent including cylindrical shaped segments having only three struts extending between each interconnecting element extending distally from the cylindrical shaped segment and the nearest interconnecting element extending proximally from the cylindrical shaped segment;

whereby, upon expansion of the stent, struts of adjacent segments are displaced relative to each other about the periphery of the stent body to accommodate longitudinal flexing of the stent within the segments and without interference between adjacent segments.

2. The stent of claim 1 wherein the stent is made of metal.
3. The stent of claim 2 wherein the metal is a shape memory alloy.
4. The stent of claim 2 wherein the stent forms a thin-walled tubular member.
5. The stent of claim 1 formed as a self-expanding configuration.
6. The stent of claim 1 formed as a mechanically expandable configuration.
7. The stent of claim 1 wherein the interconnecting elements between adjacent segments are of the same length.
8. The stent of claim 1 wherein the stent further includes end segments and intermediate segments and the end segments of the stent include longer struts than the intermediate segments of the stent.
9. The stent of claim 1 wherein the paired struts are substantially parallel.
10. A tubular, flexible, expandable stent, comprising:

a plurality of cylindrical shaped segments aligned on a common longitudinal axis, each segment being defined by a member formed in a closed undulating pattern of interconnected struts to define the periphery of the expandable stent, and in which circumferentially adjacent struts are interconnected at only one end of the struts and

a plurality of interconnecting elements each extending from one segment to an adjacent segment,

each interconnecting element having a proximal end and a distal end, the distal end circumferentially and longitudinally offset from the proximal end, the interconnecting elements oriented non-parallel to the longitudinal axis of the stent,

the stent including interconnecting elements which are circumferentially adjacent one another and are separated from one another by at least six struts on each of the cylindrical

shaped segments from which they extend;

the stent constructed and arranged such that upon expansion of the stent, struts of the adjacent segments are displaced relative to each other about the periphery of the stent body to accommodate longitudinal flexing of the stent within the segments and without interference between adjacent segments.

11. The stent of claim 10 wherein each interconnecting element is substantially straight.

12. The stent of claim 1 wherein each interconnecting element is substantially straight.

13. The stent of claim 10 wherein the stent further includes end segments and intermediate segments and the end segments of the stent include longer struts than the intermediate segments of the stent.

14. A stent having a longitudinal axis,

the stent comprising a plurality of closed serpentine segments, the serpentine segments extending circumferentially about the stent,

each serpentine segment having a first end and a second end, the first end characterized by a plurality of end portions separated by gaps, the second end characterized by a plurality of end portions separated by gaps, the gaps on the first end circumferentially offset from the gaps on the second end and the end portions on the first end circumferentially offset from the end portions on the second end,

a serpentine segment at a first end of the stent having a plurality of interconnecting elements extending from one end of the segment only to a segment adjacent thereto and a serpentine segment at a second end of the stent having a plurality of interconnecting elements extending from one end of the serpentine segment only to a serpentine segment adjacent thereto,

a plurality of serpentine segments which are located between the segments at the first and second ends of the stent having interconnecting elements extending from both ends of the segments,

each interconnecting element extending from an end portion of a segment to an end portion of a serpentine segment adjacent thereto,

each interconnecting element having a proximal end and a distal end, the distal end circumferentially and longitudinally offset from the proximal end, the interconnecting elements oriented non-parallel to the longitudinal axis of the stent,

the stent including interconnecting elements which are circumferentially adjacent one another, which are substantially parallel to one another and which are separated from one another by two end portions of a second end of a serpentine segment from which the interconnecting elements extend and two end portions of a first end of an adjacent serpentine segment from which the interconnecting elements extend.

16. The stent of claim 15 wherein the interconnecting elements are substantially straight.

17. The stent of claim 14 having a serpentine segment which is proximal-most and a serpentine segment which is distal-most and a plurality of serpentine segments therebetween, the proximal-most serpentine segment being longer than the serpentine segments between the proximal-most and distal-most segments.

18. The stent of claim 14 having a serpentine segment which is proximal-most and a serpentine segment which is distal-most and a plurality of serpentine segments therebetween, the proximal-most and distal-most serpentine segment being longer than the serpentine segments between the proximal-most and distal-most segments.

20. The stent of claim 1 comprising interconnecting elements which are circumferentially adjacent one another and are separated from one another by at least six struts on each of the cylindrical shaped segments from which they extend.

21. The stent of claim 1 comprising interconnecting elements which are circumferentially adjacent one another and are separated from one another by six struts on each of the cylindrical shaped segments from which they extend.

22. The stent of claim 10 comprising interconnecting elements which are circumferentially adjacent one another and are separated from one another by six struts on each of the cylindrical shaped segments from which they extend.

23. A tubular, flexible, expandable stent having a proximal end and a distal end and comprising:

a plurality of cylindrical shaped segments aligned on a common longitudinal axis to define a generally tubular stent body, each segment being defined by an undulating pattern of interconnected struts to define the periphery of the stent body, circumferentially adjacent struts interconnected at only one end of the struts; and

a plurality of interconnecting elements, each interconnecting element extending from an interconnected end of circumferentially adjacent struts on one segment to an interconnected end of circumferentially adjacent struts on an adjacent segment, each interconnecting element having a proximal end and a distal end, the distal end circumferentially and longitudinally offset from the proximal end, the interconnecting elements oriented non-parallel to the common longitudinal axis;

the stent including cylindrical shaped segments having at least three struts extending between each interconnecting element extending distally from the cylindrical shaped segment and the nearest interconnecting element extending proximally from the cylindrical shaped segment, interconnecting elements which are circumferentially adjacent one another separated from one another by six struts on each of the cylindrical shaped segments from which they extend.

24. A stent having a longitudinal axis,

the stent comprising a plurality of closed serpentine segments, the serpentine segments extending circumferentially about the stent,

each serpentine segment having a first end and a second end, the first end characterized by a plurality of end portions separated by gaps, the second end characterized by a plurality of end portions separated by gaps, the gaps on the first end circumferentially offset from the gaps on the second end and the end portions on the first end circumferentially offset from the end portions on the second end,

a serpentine segment at a first end of the stent having a plurality of interconnecting elements extending from one end of the segment only to a segment adjacent thereto and a serpentine segment at a second end of the stent having a plurality of interconnecting elements extending from one end of the serpentine segment only to a serpentine segment adjacent thereto,

a plurality of serpentine segments which are located between the segments at the first and second ends of the stent having interconnecting elements extending from less than all of the end portions at both ends of the segments,

each interconnecting element extending from an end portion of a segment to an end portion of a serpentine segment adjacent thereto,

each interconnecting element having a proximal end and a distal end, the distal end circumferentially and longitudinally offset from the proximal end, the interconnecting elements oriented non-parallel to the longitudinal axis of the stent.

Pending claims from 09/197,278.

39. A stent with a proximal end, a distal end and a longitudinal axis, the stent comprising:

a plurality of undulating band-like elements having alternating peaks and troughs, each undulating band-like element extending about the longitudinal axis, the plurality of undulating band-like elements extending from the proximal end of the stent to the distal end of the stent, adjacent undulating band-like elements separated by gaps which are shorter in longitudinal length than the undulating band-like elements,

the plurality of undulating band-like elements including a first undulating band-like element, a second undulating band-like element and a third undulating band-like element, the second undulating band-like element disposed between the first and third undulating band-like elements, and a plurality of substantially linear interconnecting elements extending between undulating band-like elements which are adjacent one another, each interconnecting element having a first end and a second end which is offset circumferentially and longitudinally along the stent from the first end,

the plurality of interconnecting elements including first interconnecting elements and second interconnecting elements,

the first interconnecting elements extending between peaks on the first undulating band-like element and troughs on the second undulating band-like element, the number of peaks on the first undulating band-like element exceeding the number of first interconnecting elements, the second interconnecting elements extending between peaks on the second undulating band-like element and troughs on the third undulating band-like element, the number of peaks on the second undulating band-like element exceeding the number of second interconnecting elements,

wherein the number of peaks of the first undulating band-like element separating circumferentially adjacent first interconnecting elements is less than the number of peaks of the second undulating band-like element separating circumferentially adjacent second interconnecting elements.

40. A stent with a proximal end, a distal end and a longitudinal axis, the stent comprising:

a plurality of undulating band-like elements having alternating peaks and troughs, each undulating band-like element extending about the longitudinal axis, the plurality of undulating band-like elements extending from the proximal end of the stent to the distal end of the stent, adjacent undulating band-like elements separated by gaps which are shorter in longitudinal length than the undulating band-like elements,

the plurality of undulating band-like elements including a first undulating band-like element, a second undulating band-like element, a third undulating band-like element, and a fourth band-like element, the second undulating band-like element disposed between the first and third undulating band-like elements, the third undulating band-like element disposed between the second and fourth undulating band-like elements, and

a plurality of interconnecting elements extending between undulating band-like elements which are adjacent one another, each interconnecting element having a first end and a second end which is offset circumferentially and longitudinally along the stent from the first end,

the plurality of interconnecting elements including first interconnecting elements, second interconnecting elements, and third interconnecting elements,

the first interconnecting elements extending between peaks on the first undulating band-like element and troughs on the second undulating band-like element, the number of peaks on the first undulating band-like element exceeding the number of first interconnecting elements, the second interconnecting elements extending between peaks on the second undulating band-like element and troughs on the third undulating band-like element, the number of peaks on the second undulating

band-like element exceeding the number of second interconnecting elements, the third interconnecting elements extending between peaks on the third undulating band-like element and troughs on the fourth undulating band-like element,

the number of peaks of the first undulating band-like element separating circumferentially adjacent first interconnecting elements being less than the number of peaks of the second undulating band-like element separating circumferentially adjacent second interconnecting elements

wherein each second interconnecting element is separated from the third interconnecting element nearest to it by a single peak of the third undulating band-like element and a single trough of the third undulating band-like element.

41. The stent of claim 40 where one third interconnecting element extends from every third peak of the third undulating band-like element.

43. The stent of claim 40 where the interconnecting elements are substantially linear.

44. The stent of claim 41 where the interconnecting elements are substantially linear.

45. The stent of claim 40 wherein the first undulating band-like element is characterized by a first amplitude and the second undulating band-like element is characterized by a second amplitude, the first amplitude greater than the second amplitude.

46. A stent with a longitudinal axis, the stent comprising:

a plurality of undulating band-like elements having alternating peaks and troughs, each undulating band-like element extending about the longitudinal axis, the plurality of undulating band-like elements including a proximal undulating band-like element of a single first wavelength and single first amplitude having alternating peaks and troughs, an intermediate undulating band-like element of a single second wavelength and single second amplitude having alternating peaks and troughs, and a distal undulating band-like element of the first wavelength and first amplitude having alternating peaks and troughs, the intermediate undulating band-like element disposed between the proximal and distal undulating band-like elements, and

a plurality of interconnecting elements extending between undulating band-like elements which are adjacent one another, each interconnecting element having a first end and a second end which is offset circumferentially and longitudinally along the stent from the first end,

the plurality of interconnecting elements including first interconnecting elements and second interconnecting elements,

the first interconnecting elements extending between peaks on the proximal undulating band-like element and troughs on the intermediate undulating band-like element,

the second interconnecting elements extending between peaks on the intermediate undulating band-like element and troughs on the distal undulating band-like element,

wherein the first ends of the first interconnecting elements extend from every third peak of the proximal undulating band-like element and the second ends of the second interconnecting elements extend from every third trough of the distal undulating band-like element.

47. The stent of claim 46 wherein the plurality of undulating band-like elements further comprises a second distal undulating band-like element having alternating peaks and troughs, the second distal undulating band-like element distal to the distal undulating band-like element,

the plurality of interconnecting elements including third interconnecting elements extending between peaks on the distal undulating band-like element and troughs on the second distal undulating band-like element,

wherein each second interconnecting element is separated from the third interconnecting element nearest to it by a single peak and a single trough of the distal undulating band-like element.

48. The stent of claim 47 wherein the interconnecting elements are linear.

49. The stent of claim 48 wherein the first amplitude is greater than the second amplitude, and the first wavelength is greater than the second wavelength.

50. A stent with a longitudinal axis, the stent comprising:

a plurality of undulating band-like elements having alternating peaks and troughs, each undulating band-like element extending about the longitudinal axis, undulating band-like elements which are adjacent one another separated by a gap which is shorter in longitudinal length than each of the adjacent undulating band-like elements, the plurality of undulating band-like elements including a first undulating band-like element and a second undulating band-like element, the first and second undulating band-like elements adjacent one another, and

a plurality of substantially linear interconnecting elements extending between undulating band-like elements which are adjacent one another, each interconnecting element having a first end and a second end which is offset circumferentially and longitudinally along the stent from the first end, the plurality of interconnecting elements including first interconnecting elements, the first interconnecting elements extending between peaks on the first undulating band-like element and troughs on the second undulating band-like element, first interconnecting elements which are adjacent one another connected to each other via a first path along the undulating first band-like element, the first path having a first length, and via a second path along the undulating second band-like element, the second path having a second length, wherein the first path length is different from the second path length.

52. The stent of claim 50 wherein the first and second undulating band-like elements are characterized by different amplitudes.

53. The stent of claim 50 wherein the first path length is longer than the second path length.

54. A stent comprising:

a plurality of undulating band-like elements having alternating peaks and troughs, the plurality of undulating band-like elements including a first undulating band-like element, a second undulating band-like element and a third undulating band-like element, the first, second and third undulating band-like elements disposed sequentially along the length of the stent, and

a plurality of substantially linear interconnecting elements extending between undulating band-like elements which are adjacent one another, each interconnecting element having a first end and a second end which is offset circumferentially and longitudinally along the stent from the first end, the interconnecting elements shorter in length than the undulating band-like elements which they connect,

the plurality of interconnecting elements including first interconnecting elements extending between peaks on the first undulating band-like element and troughs on the second undulating band-like element and second interconnecting elements extending between peaks on the second undulating band-like element and troughs on the third undulating band-like element, first interconnecting elements which are adjacent one another connected to each other via a first path along the first undulating band-like element, second interconnecting elements which are adjacent one another connected to each other via a second path along the second undulating band-like element, the second path having a second length, wherein the first path length is different from the second path length.

56. The stent of claim 54 wherein the first and second undulating band-like elements are characterized by different amplitudes.

57. The stent of claim 54 wherein the first path length is longer than the second path length.

58. The stent of claim 46 wherein the first amplitude is equal to the second amplitude and the first wavelength is equal to the second wavelength.

Pending claims from 09/666,866.

36. A stent comprising:

a plurality of adjacent serpentine circumferential bands, each of the serpentine circumferential bands having a proximal end region and a distal end region, the proximal end region and the distal end region each having a plurality of end portions; and

a plurality of connecting elements, each connecting element joining end portions of adjacent serpentine circumferential bands, wherein the end portions of the adjacent serpentine circumferential bands which are joined to one another are not longitudinally opposite one another, some of the serpentine bands having connecting elements extending from the proximal end region and the distal end region.

37. The stent of claim 36 wherein each serpentine circumferential band comprises a plurality of interconnected struts, the interconnected struts having a length, the length of the struts of the serpentine circumferential bands at each end of the stent being different than the length of the struts of the serpentine circumferential bands positioned therebetween.

39. The stent of claim 36 wherein each serpentine circumferential band comprises a pattern of interconnected struts, the pattern of at least one circumferential band being different than the pattern of adjacent serpentine circumferential bands.

40. The stent of claim 36 wherein the stent is expandable from an unexpanded state to an expanded state and each serpentine circumferential band comprises a pattern of interconnected struts, in the unexpanded state at least a portion of the interconnected struts being parallel to one another.

41. The stent of claim 36 constructed and arranged to be self-expanding.

42. The stent of claim 36 constructed and arranged to be balloon expandable.

43. The stent of claim 36 wherein the stent is constructed from a shape memory material.

44. A stent comprising:

a plurality of adjacent serpentine circumferential bands, each of the serpentine circumferential bands having a plurality of end portions; and

a plurality of connectors, each connector joining two adjacent serpentine circumferential bands, each connector having a first end and a second end and a portion extending at an oblique angle relative to a longitudinal axis of the stent, the first end extending from an end portion of one of the serpentine circumferential bands, the second end extending from an end portion of a serpentine circumferential band adjacent thereto.

45. The stent of claim 44 wherein each serpentine circumferential band comprises a plurality of interconnected struts, the interconnected struts having a length, the length of the struts of the serpentine circumferential bands at each end of the stent being different than the length of the struts of the serpentine circumferential bands positioned therebetween.

46. The stent of claim 44 wherein each serpentine circumferential band comprises a pattern of interconnected struts, the pattern of at least one circumferential band being different than the pattern of adjacent serpentine circumferential bands.

47. The stent of claim 44 wherein the stent is expandable from an unexpanded state to an expanded state and each serpentine circumferential band comprises a pattern of interconnected struts, in the unexpanded state at least a portion of the interconnected struts being parallel to one another.

48. The stent of claim 44 constructed and arranged to be self-expanding.

49. The stent of claim 44 constructed and arranged to be balloon expandable.

50. The stent of claim 44 wherein the stent is constructed from a shape memory material.

Pending claims from 09/878,596.

38. A stent comprising a plurality of serpentine bands, the serpentine bands including a proximal-most serpentine band, a distal-most serpentine band and a plurality of serpentine bands therebetween, the serpentine bands including larger serpentine bands having alternating peaks and troughs and smaller serpentine bands having alternating peaks and troughs, the larger serpentine bands of larger wavelength and amplitude than the smaller serpentine bands, the larger and smaller serpentine bands alternating with one another over the length of the stent, larger and smaller serpentine bands which are adjacent to one another connected one to the other, larger serpentine bands which are disposed between the proximal-most and distal-most serpentine bands including peaks which are not directly connected to an adjacent smaller serpentine band.

39. The stent of claim 38 wherein each of the serpentine bands is characterized by a plurality of alternating peaks and troughs, the peaks disposed at a distal end of the serpentine band, the troughs disposed at a proximal end of the serpentine band.

40. The stent of claim 38 wherein serpentine bands which are adjacent one another are connected peak to trough.

41. A stent comprising:

first serpentine bands having alternating peaks and troughs, each first serpentine band having peaks disposed at a distal end of the first serpentine band and troughs disposed at a proximal end of the first serpentine band; and

second serpentine bands having alternating peaks and troughs, each second serpentine band having peaks disposed at a distal end of the second serpentine band and troughs disposed at a proximal end of the second serpentine band, the first serpentine bands having more peaks and troughs than the second serpentine bands;

the first and second serpentine bands alternating along the length of the stent,

each first serpentine band which is proximally adjacent to a second serpentine band connected thereto peak to trough at a plurality of locations, each first serpentine band including some peaks which are not directly connected to an adjacent second serpentine band.

43. A stent comprising a plurality of first serpentine bands each of which has a proximal end and a distal end, each first serpentine band comprising a plurality of alternating peaks and troughs, some of the peaks disposed at the distal end of the first serpentine band and some of the peaks disposed between the distal and proximal ends of the first serpentine band, some of the troughs disposed at the proximal end of the first serpentine band and some of the troughs disposed between the distal and proximal ends of the first serpentine band, neighboring first serpentine bands connected one to the other.

44. The stent of claim 43 wherein neighboring first serpentine bands are connected one to the other via a plurality of members, each member extending from a peak of one first serpentine band to a trough of a neighboring first serpentine band.

45. The stent of claim 44 wherein each member has a first end and a second end, the first end longitudinally and circumferentially offset from the second end.

46. The stent of claim 45 wherein each member includes a straight portion which is nonparallel with the longitudinal axis of the stent.

47. The stent of claim 44 wherein neighboring first serpentine bands are connected one to the other via a plurality of members, each member extending from a peak of one first serpentine band to a trough of a neighboring first serpentine band, each member including a straight portion which is nonparallel to the longitudinal axis of the stent.

48. The stent of claim 44 wherein neighboring first serpentine bands are connected one to the other via a plurality of members, each member including a straight portion which is nonparallel to the longitudinal axis of the stent.

49. A stent comprising a plurality of first serpentine bands and a plurality of second serpentine bands, each first serpentine band including a plurality of alternating peaks and troughs, each second serpentine band including a plurality of alternating peaks and troughs, the spacing between adjacent peaks of each first serpentine band larger than the spacing between adjacent peaks of each second serpentine band, the first and second serpentine bands connected one to the other peak to trough only, the first and second serpentine bands alternating with one another.

53. The stent of claim 49 wherein the length of the first serpentine band as defined by the longitudinal distance between the proximal-most and distal-most portions of the first serpentine band exceeds the length of the second serpentine band as defined by the longitudinal distance between the proximal-most and distal-most portions of the second serpentine band.

54. A stent comprising a plurality of serpentine bands including a plurality of first serpentine bands and a plurality of second serpentine bands, the first and second serpentine bands alternating with one another along the length of the stent,

each serpentine band comprising a plurality of alternating peaks and troughs,

first serpentine bands connected to distally adjacent second serpentine bands peak to trough at a plurality of connection locations on the first and second serpentine bands,

each first serpentine band and distally adjacent second serpentine band having a first pathway extending along the first serpentine band between circumferentially adjacent connection locations on the first serpentine band and a second pathway extending along the second serpentine band between circumferentially adjacent connection locations on the second serpentine band, the first pathway traversing more peaks and troughs than the second pathway, the connection locations between first serpentine bands and second serpentine bands distally adjacent thereto being only at peaks of the first serpentine bands and troughs of the second serpentine bands.

55. The stent of claim 54 comprising a plurality of said first and second serpentine bands.

56. A stent for holding open a blood vessel comprising:

a first loop containing section, the first loop containing section arranged generally in the circumferential direction, the loops in said first loop containing section occurring at a first frequency;

a second loop containing section, the second loop containing section arranged generally in the circumferential direction, the loops in said second loop containing section also occurring at said first frequency; and

a third loop containing section, the loops in said third loop containing section occurring at a second frequency that is higher than said first frequency, the third loop containing section disposed in the generally circumferential space between said first and second loop containing sections and alternately joined to said first and second loop containing sections such that said first and second loop containing sections are joined together through the third loop containing section without connection directly between the first and second loop containing sections.

57. A stent according to claim 56, wherein the second frequency elements provide improved flexibility.

58. A stent according to claim 56, wherein the stent is made of stainless steel.

59. A stent according to claim 56, wherein substantially each cell in the stent encompasses the same area.

60. A stent according to claim 56, wherein the cell is arranged so that when expanded a

length of the cell along a circumference of the stent is longer than a length of a cell along the longitudinal axis of the stent.

61. A stent according to claim 56, wherein the stent is made from NiTi.

62. A stent for widening a vessel in the human body comprising:
a plurality of first circumferential bands containing a pattern of loops at a first frequency;
a plurality of second circumferential bands containing a pattern of loops at a second frequency higher than said first frequency, alternating with said first circumferential bands and periodically coupled thereto to form cells such that said first circumferential bands are joined together through said second circumferential bands without connection between said first circumferential bands.

63. An expandable stent comprising a plurality of enclosed flexible spaces, each of the plurality of enclosed flexible spaces delineated by a plurality of cells, each cell comprising:
a) a first member having a first end and a second end;
b) a second member having a first end and a second end;
c) a third member having a first end and a second end;
d) a fourth member having a first end and a second end; the first end of the first member communicating with the first end of the second member, the second end of the second member communicating with the second end of the third member, and the first end of the third member communicating with the first end of the fourth member;
e) the first member and the second member with the curved portion at their ends forming a first loop;
f) the third member and the fourth member with the curved portion at their ends forming a second loop;
g) a fifth member having a first end and a second end;
h) a sixth member having a first end and a second end;
i) a seventh member having a first end and a second end;
j) an eighth member having a first end and a second end;
k) a ninth member having a first end and a second end; and
l) a tenth member having a first end and a second end, the first end of the fifth member coupled to the second end of the first member, the second-end of the fifth member communicating with the second end of the sixth member, the first end of the sixth member communicating with the first end of the seventh member, the second end of the seventh member communicating with the second end of the eighth member, the first end of the eight member communicating with the first end of the ninth member, the second end of the ninth member communicating with the second end of the tenth member, and the first end of the of the tenth member coupled to the second end of the fourth member;
m) the fifth member and the sixth member with the curved portion at their ends forming a third loop;
n) the seventh member and the eighth member with the curved portion at their ends forming a fourth loop; and
o) the ninth member and the tenth member with the curved portion at their ends forming a fifth loop, wherein the sixth, and ninth members are shorter in length than at least one of the fifth, seventh, eight, or tenth members for providing different flexibility or radial compression characteristics to the stent.

64. The stent of claim 63, wherein the first member, the third member, the sixth member, the eighth member, and the tenth member have substantially the same angular orientation to the longitudinal axis of the stent and the second member, the fourth member, the fifth member, the

seventh member, and the ninth member have substantially the same angular orientation to the longitudinal axis of the stent.

65. The stent of claim 64, wherein the fifth, sixth, seventh, eighth, ninth, and tenth members provide improved flexibility.

66. The stent of claim 62, wherein a substantial portion of each of the members is substantially straight.

67. The stent of claim 62, wherein the members are comprised of metal.

68. The stent of claim 67, wherein the metal is selected from the group consisting of stainless steel and nitinol.

69. The stent of claim 62, wherein the first, second, third, and fourth members and the fifth, sixth, seventh, eighth, ninth, and tenth members are provided with different flexibilities with respect to each other.

70. The stent of claim 62, wherein the first, second, third, and fourth members and the fifth, sixth, seventh, eighth, ninth, and tenth members are provided with different resistances to radial compression with respect to each other.

71. The stent of claim 62, wherein the fifth, sixth, seventh, eighth, ninth, and tenth members have a greater resistance to radial compression than the first, second, third, and fourth members.

72. The stent of claim 62, wherein at least one portion of at least one of the first, second, third, and fourth members and at least one portion of at least one of the fifth, sixth, seventh, eighth, ninth, and tenth members are provided with different resistances to radial compression with respect to each other.

73. The stent of claim 62, wherein at least one portion of at least one of the plurality of the first, second, third, and fourth members is provided with at least one portion that has a greater resistance to radial compression than at least one portion of at least one of the fifth, sixth, seventh, eighth, ninth, and tenth members.

74. The stent of claim 62, wherein at least one portion of at least one of the fifth, sixth, seventh, eighth, ninth, and tenth members is provided with at least one portion that has a greater resistance to radial compression than at least one portion of at least one of the first, second, third, and fourth members.

75. The stent of claim 56 wherein said stent is self-expanding.

76. The stent of claim 56 wherein said stent is balloon expanded.

77. A stent for holding open a blood vessel comprising:

a first loop containing section, the first loop containing section arranged generally in the circumferential direction, the loops in said first loop containing section occurring at a first frequency;

a second loop containing section, the second loop containing section arranged generally in the circumferential direction, the loops in said second loop containing section also occurring at said first frequency; and

a third loop containing section, the loops in said third loop containing section occurring at a second frequency that is higher than said first frequency, the third loop containing section disposed in the generally circumferential space between said first and second loop containing sections and alternately joined to said first and second loop containing sections such that said first and second loop containing sections are joined together through the third loop containing section without connection directly between the first and second loop containing sections

a fourth loop containing section, the fourth loop containing section arranged generally in the circumferential direction, the second loop containing section disposed in the generally circumferential space between said third and fourth loop containing sections and alternately

joined to said first and second loop containing sections such that said third and fourth loop containing sections are joined together through the second loop containing section without connection directly between the third and fourth loop containing sections;

wherein successive loop containing sections along the length of the stent are connected one to the other only through loops of the loop containing sections.

78. A stent for widening a vessel in the human body comprising:

a plurality of first circumferential bands containing a pattern of loops at a first frequency;

a plurality of second circumferential bands containing a pattern of loops at a second frequency higher than said first frequency, alternating with said first circumferential bands and periodically coupled thereto to form cells such that said first circumferential bands are joined together through said second circumferential bands without connection between said first circumferential bands

wherein connections between adjacent first and second circumferential bands are only from loops on one circumferential band to loops an adjacent circumferential band.

79. A stent comprising a plurality of serpentine bands including:

a first serpentine section extending in a circumferential direction and comprising a plurality of alternating peaks and troughs, the first serpentine section characterized by a first frequency;

a second serpentine section extending in a circumferential direction and comprising a plurality of alternating peaks and troughs, the second serpentine section also characterized by the first frequency;

a third serpentine section extending in a circumferential direction and comprising a plurality of alternating peaks and troughs, the third serpentine section characterized by a second frequency that is higher than the first frequency, the third serpentine section disposed between the first and second serpentine sections and alternately joined to the first and second serpentine sections such that the first and second serpentine sections are joined together through the third serpentine section without direct connection between the first and second serpentine sections; and

a fourth serpentine section extending in a circumferential direction and comprising a plurality of alternating peaks and troughs, the fourth serpentine section characterized by the second frequency, the fourth serpentine section disposed adjacent the second serpentine section, the second serpentine section disposed between the fourth serpentine section and the third serpentine section, the second serpentine section alternately joined to the third and fourth serpentine sections such that the third and fourth serpentine sections are joined together through the second serpentine section without direct connection between the third and fourth serpentine sections

wherein connections between adjacent serpentine bands are only from peaks on one band to troughs on an adjacent band.

80. A stent for widening a vessel in the human body comprising:

a plurality of first serpentine circumferential bands of a first frequency; and

a plurality of second serpentine circumferential bands of a second frequency higher than the first frequency, alternating with the first serpentine circumferential bands and periodically coupled thereto to form cells such that said first serpentine circumferential bands are joined together through said second serpentine bands without connection between said first serpentine circumferential bands

wherein connections between adjacent serpentine bands are only from peaks on one band to troughs on an adjacent band.

81. A stent comprising: a first loop containing section arranged in a circumferential direction and defining loops therein occurring at a first frequency; a second loop containing section arranged in the circumferential direction and defining loops therein occurring at the first frequency; a third loop containing section disposed in a generally circumferential space between the first loop containing section and the second loop containing section and coupling the first loop containing section to the second loop containing section for defining cells therebetween, the third loop containing section defining loops therein occurring at a second frequency that is greater than the first frequency.

82. The stent according to claim 81, wherein the first and second loop containing sections are each part of a continuous circumferential member having a plurality of the first and second loop containing sections respectively and the third loop containing section is also part a continuous loop having a plurality of the third loop containing sections coupled to first and second loop containing sections for defining the cells.

83. The stent according to claim 81, wherein the first and second loop containing sections are each part of a continuous circumferential member having a plurality of the first and second loop containing sections respectively and wherein a plurality of the third loop containing sections each having one end connected to one of the first loop containing sections and another end connected to one of the second loop containing sections are provided.

84. A stent of open configuration comprising a plurality of first and second interconnecting band-like elements characterized by alternating peaks and troughs, each of the first band-like elements having more peaks than each of the second band-like elements; each of the first and second band-like elements having a generally serpentine configuration; wherein each of the first band-like elements and each adjacent second band-like element are interconnected and alternate over the length of the stent.

85. The stent of claim 84 wherein the peaks of each of the first band-like elements are spaced closer together than the peaks of each of the second band-like elements.

86. The stent of claim 85 wherein the troughs of each of the first band-like elements are spaced closer together than the troughs of each of the second band-like elements.

87. The stent of claim 86 wherein the first and second band-like elements are characterized by wavelength and amplitude of the first band-like elements that exceed the wave length and amplitude of the first band-like elements.

88. The stent of claim 87 wherein adjacent first and second band – like elements are interconnected by a plurality of interconnecting elements.

89. The stent of claim 84 wherein adjacent first and second band-like elements are interconnected by a plurality of interconnecting elements.

90. The stent of claim 87 wherein adjacent first and second band-like elements are joined by a plurality of interconnecting elements which extend from peaks on the first band-like elements, circumferentially adjacent interconnecting elements spaced five peaks apart along the first band-like element.

91. The stent of claim 84 wherein adjacent first and second band-like elements are joined by a plurality of interconnecting elements which extend from peaks on the first band-like elements, circumferentially adjacent interconnecting elements spaced five peaks apart along the first band-like element.

92. A stent according to claim 56, wherein the first loop and second loop containing sections are relatively adapted to enable radial support and the third loop containing section is relatively adapted to enable longitudinal flexibility.

93. A stent according to claim 56, wherein the first loop and second loop containing sections

have wider struts than the third loop containing section.

94. A stent according to claim 56, wherein the relative widths of said struts is such that when said stent is crimped for insertion into a lumen of a blood vessel, said third loop containing section is crimpable to essentially the same diameter as said first loop and second containing sections.

95. A stent according to claim 57, wherein, while flexing, the second frequency elements have maximal strain that is lower than the elastic limit for the material of the stent.

96. A stent according to claim 95, wherein, the maximal strain of the expanded stent within a blood vessel caused by repeated flexing is below the strain which would cause permanent deformation for the material of the stent.

97. A stent according to claim 96, wherein, said stent is made of stainless steel and said maximal strain is below approximately 0.5%.

98. A stent according to claim 62, wherein the first circumferential bands have struts that are wider than the struts in said second circumferential bands.

99. A stent according to claim 98, wherein the relative widths of said loops is such that when said stent is crimped for insertion into a lumen of a blood vessel, the loops of said second circumferential bands are crimpable to essentially the same diameter as the loops of said first circumferential bands.

100. A stent according to claim 98, wherein the higher frequency of the loops in said second circumferential bands provide improved flexibility.

101. A stent according to claim 100, wherein, while flexing, elements in the higher frequency loops have lower maximal strain.

102. A stent according to claim 101, wherein, the maximal strain of the expanded strain within a blood vessel caused by repeated flexing is below the maximum strain causing permanent deformation for the material of the stent.

103. A stent according to claim 102, wherein, said stent is made of stainless steel and said lower maximal strain is below approximately 0.5%.

104. The stent of claim 63, wherein the first, second, third, and fourth members in at least one of the plurality of spaces have a width that is greater than the width of the fifth, sixth, seventh, eighth, ninth, and tenth members in that space.

105. The stent of claim 104, wherein the relative widths of said the fifth, sixth, seventh, eighth, ninth, and tenth members with respect to said first, second, third, and fourth members is such that when said stent is crimped for insertion into a lumen of a blood vessel, the fifth, sixth, seventh, eighth, ninth, and tenth members are crimpable to essentially the same size as said first, second, third, and fourth members.

106. The stent of claim 105, wherein the fifth, sixth, seventh, eighth, ninth, and tenth members provide improved flexibility.

107. The stent of claim 106, wherein, while flexing, the fifth, sixth, seventh, eighth, ninth, and tenth members have maximal strain wherein the maximal strain of the expanded stent within a blood vessel caused by repeated flexing is below the strain which would cause permanent deformation for the material of the stent.

108. The stent of claim 107, wherein, said lower maximal strain is below the maximum strain causing permanent deformation for the material of the stent.

109. The stent of claim 108, wherein, said stent is made of stainless steel and said lower maximal strain is below approximately 0.5%.

110. The stent of claim 69, wherein the fifth, sixth, seventh, eighth, ninth, and tenth members patterns are more flexible than the first, second, third, and fourth members.

111. The stent of claim 69, wherein at least one portion of at least one of the fifth, sixth, seventh, eighth, ninth, and tenth members is provided with at least one portion that is more flexible than at least one portion of at least one of the first, second, third, and fourth members.
112. The stent of claim 70, wherein the first, second, third, and fourth members have a greater resistance to radial compression than the fifth, sixth, seventh, eighth, ninth, and tenth members.
113. A stent according to claim 95, wherein the stent is disposed within a vessel that is repeatedly fixed by the systolic cycle of a coronary artery.
114. A stent according to claim 96, wherein, said stent is made of super elastic Nitinol and said maximal strain is below approximately 10% upon expansion or flexing.
115. A stent according to claim 58, wherein the stent is made of super elastic Nitinol.
116. A stent according to claim 62, wherein each cell further includes at least one of the first circumferential bands and at least two of the second circumferential bands, wherein the first circumferential band includes loops at a first frequency and the second circumferential band includes loops at a second frequency such that the second frequency is higher than the first frequency.
117. A stent according to claim 97, wherein the first and second loop containing sections are out of phase with each other.
118. A stent according to claim 62 wherein the first circumferential bands containing a pattern of loops include first circumferential bands which are out of phase with one another.
119. A stent for holding open a blood vessel comprising:

a. a first loop containing section, the first loop containing section arranged generally in the circumferential direction, the loops in said first loop containing section occurring at a first frequency;

b. a second loop containing section, the second loop containing section arranged generally in the circumferential direction, the loops in said second loop containing section also occurring at said first frequency; and

c. a third loop containing section the third loop containing section, the loops in said third loop containing section occurring at a second frequency that is higher than said first frequency, disposed in the generally circumferential space between said first and second loop containing sections and alternately joined to said first and second loop containing sections,

d. wherein the loops in said first, second and third loop containing sections are disposed and adapted to cooperate so that, when the expanded stent is in a curved lumen, cells on the outside of the curve open in length, but narrow circumferentially whereas cells on the inside of the curve shorten in length but widen circumferentially.

120. A stent according to claim 119 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant density of stent element area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.
121. A stent according to claim 119 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant stent cell area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.
122. A stent for widening a vessel in the human body comprising:

a. a plurality of first circumferential bands containing a pattern of loops at a first frequency;

b. a plurality of second circumferential bands containing a pattern of loops at a second frequency higher than said first frequency, alternating with said first circumferential bands and periodically coupled thereto to form cells,

c. wherein loops in said bands are disposed and adapted to cooperate so that, when the expanded stent is in a curved lumen, cells on the outside of the curve open in length, but narrow circumferentially whereas cells on the inside of the curve shorten in length but widen circumferentially.

123. A stent according to claim 122 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant density of stent element area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

124. A stent according to claim 122 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant stent cell area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

125. A stent for holding open a blood vessel formed of a plurality of triangular cells, each triangular cell comprising:

a. a first loop containing section, the first loop containing section arranged generally in the circumferential direction;

b. a second loop containing section joined to the first loop containing section at a first junction point; and

c. a third loop containing section joined to the first loop containing section at a second junction point and joined to the second loop containing section at a third junction point,

d. wherein loops in said cells are disposed and adapted to cooperate so that, when the expanded stent is in a curved vessel, cells on the outside of the curve open in length, but narrow circumferentially whereas cells on the inside of the curve shorten in length but widen circumferentially.

126. A stent according to claim 125 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant density of stent element area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

127. A stent according to claim 125 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant stent cell area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

128. A stent for widening a vessel in the human body comprising:

a. a plurality of first meander patterns;

b. a plurality of second meander patterns intertwined with the first meander patterns to form triangular cells, said first meander patterns and said second meander patterns disposed and adapted to cooperate so that after expansion of said stent, when said stent is dispose in a curved vessel, cells on the outside of the curve open in length, but narrow circumferentially whereas cells on the inside of the curve shorten in length but widen circumferentially.

129. A stent according to claim 128 wherein compensation, which occurs when cells on the

outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant density of stent element area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

130. A stent according to claim 128 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant stent cell area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

131. A multicellular stent for holding open a lumen, comprising:

a. a plurality of even and odd vertical meander patterns, the odd vertical meander patterns being located between every two even vertical meander patterns and being out of phase with the even vertical meander patterns,

b. a plurality of even and odd horizontal meander patterns, the odd horizontal meander patterns being located between every two even horizontal meander patterns,

c. wherein the vertical meander patterns are intertwined with the horizontal meander patterns to form a plurality of triangular cells,

d. wherein said horizontal meander patterns and said vertical meander patterns are disposed and adapted to cooperate so that after expansion of said stent, when said stent is disposed in a curved lumen, cells on the outside of the curve open in length, but narrow circumferentially whereas cells on the inside of the curve shorten in length but widen circumferentially.

132. A stent according to claim 131 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant density of stent element area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

133. A stent according to claim 131 wherein compensation, which occurs when cells on the outside of the curve open in length, but narrow circumferentially and cells on the inside of the curve shorten in length but widen circumferentially, results in a more constant stent cell area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

134. An expandable stent comprising a plurality of enclosed flexible spaces, each of the plurality of enclosed flexible spaces including:

a) a first member having a first end and a second end;

b) a second member having a first end and a second end;

c) a third member having a first end and a second end;

d) a fourth member having a first end and a second end; the first end of the first member communicating with the first end of the second member, the second end of the second member communicating with the second end of the third member, and the first end of the third member communicating with the first end of the fourth member;

e) the first member and the second member with the curved portion at their ends forming a first loop;

f) the third member and the fourth member with the curved portion at their ends forming a second loop;

g) a fifth member having a first end and a second end;

h) a sixth member having a first end and a second end;

i) a seventh member having a first end and a second end;

j) an eighth member having a first end and a second end;

k) a ninth member having a first end and a second end; and

l) a tenth member having a first end and a second end, the first end of the fifth member communicating with the second end of the first member, the second end of the fifth member communicating with the second end of the sixth member, the first end of the sixth member communicating with the first end of the seventh member, the second end of the seventh member communicating with the second end of the eighth member, the first end of the eighth member communicating with the first end of the ninth member, the second end of the ninth member communicating with the second end of the tenth member, and the first end of the of the tenth member communicating with the second end of the fourth member;

m) the fifth member and the sixth member with the curved portion at their ends forming a third loop;

n) the seventh member and the eighth member with the curved portion at their ends forming a fourth loop; and

o) the ninth member and the tenth member with the curved portion at their ends forming a fifth loop, wherein, when the expanded stent is in a curved lumen, cells on the outside of the curve at communication points of the first and fifth and fourth and tenth members, the cell opens up increasing the length of the cell and at each of the first through fifth loops, the adjoining members come closer to each other, to cause the cell to become narrower circumferentially and compensating for the increase in length, whereas cells on the outside of the curve at communication points of the first and fifth and fourth and tenth members, the cell closes down decreasing the length of the cell and at each of the first through fifth loops, the adjoining members move apart, to cause the cell to become wider circumferentially and compensate for the decrease in length.

135. A stent according to claim 134 wherein the compensation which occurs on the outside of the curve and on the inside of the curve results in a more constant density of stent element area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

136. A stent according to claim 134 wherein the compensation which occurs on the outside of the curve and on the inside of the curve results in a more constant stent area between the inside and the outside of the curve than if the cells on the outside only lengthened and cells on the inside only shortened.

Pending claims from 09/934,178.

9. A stent having a plurality of segments and comprising:

a plurality of annular elements, each annular element having a compressed state and an expanded state;

at least one connecting member connecting adjacent annular elements to form a plurality of cells, each cell having an area;

the stent having a first segment and a second segment, with the first segment having a plurality of combined adjacent cells that impart greater flexibility to the first segment than the second segment.

10. The stent of claim 9, wherein each annular element comprises a plurality of alternating struts and apices connected to each other to form a substantially annular configuration, and wherein the connecting members are connected to the apices of the adjacent annular members.

11. The stent of claim 9, wherein the difference in flexibility between the first and second segments is a difference in the longitudinal flexibilities in the first and second segments.

12. The stent of claim 9, wherein the difference in flexibility between the first and second segments is a difference in the radial flexibilities in the first and second segments.

13. The stent of claim 9, wherein the first and second segments are spaced apart longitudinally along the stent.

14. The stent of claim 9 wherein the annular elements and connecting members are made of Nitinol.

15. The stent of claim 9 wherein the annular elements and connecting members are made of a shape memory alloy.

Allowed claims from U.S. 6,348,065.

19. A tubular, flexible, self-expandable stent comprising:
1) a plurality of cylindrically shaped segments which are interconnected,
one of the cylindrically shaped segments being an intermediate cylindrically shaped segment having a proximal end and a distal end,
one of the cylindrically shaped segments being a proximal cylindrically shaped segment having a proximal end and a distal end located adjacent the proximal end of the intermediate cylindrically shaped segment and
one of the cylindrically shaped segments being a distal cylindrically shaped segment having a distal end and a proximal end located adjacent the distal end of the intermediate cylindrically shaped segment,
each cylindrically shaped segment being defined by an undulating pattern of interconnected struts, each strut having a proximal end and a distal end, each strut adjacent a first strut and a second strut, the strut and the first strut interconnected only at their distal ends, the strut and the second strut interconnected only at their proximal ends, and
2) a plurality of interconnecting elements including proximal interconnecting elements and distal interconnecting elements, each interconnecting element having a proximal end and a distal end, the proximal end of the interconnecting element circumferentially and longitudinally offset from the distal end of the interconnecting element, the interconnecting elements shorter in length than the cylindrically shaped segments,
each proximal interconnecting element extending proximally from an interconnected proximal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected distal end of adjacent struts on the proximal cylindrically shaped segment,
each distal interconnecting element extending distally from an interconnected distal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected proximal end of adjacent struts on the distal cylindrically shaped segment,
the interconnecting elements extending at an oblique angle relative to the longitudinal axis, a minimum length pathway of at least three interconnected circumferentially adjacent struts on the intermediate cylindrically shaped segment extending between the distal ends of the proximal interconnecting elements and the proximal ends of the distal interconnecting elements,
wherein flexing of the stent occurs substantially in the cylindrically shaped segments.

20. The stent of claim 19 formed of a shape memory metal.

21. The stent of claim 20 formed of nitinol.

22. The stent of claim 19 wherein each interconnecting element extends from a side of an interconnected end of adjacent struts on one cylindrically shaped segment to a side of an interconnected end of adjacent struts on an adjacent cylindrically shaped segment.

23. The stent of claim 19 wherein circumferentially adjacent interconnecting elements are separated by six struts.

24. The stent of claim 19 wherein there are at least three interconnecting elements extending between any two adjacent cylindrically shaped segments.

25. The stent of claim 19 constructed and arranged such that upon expansion of the stent, connected ends of adjacent struts in the proximal cylindrically shaped segment are circumferentially displaced relative to connected ends of adjacent struts in the intermediate cylindrically shaped segment and connected ends of adjacent struts in the intermediate cylindrically shaped segment are circumferentially displaced relative to connected ends of adjacent struts in the distal cylindrically

shaped segment to accommodate longitudinal flexing of the stent within the cylindrically shaped segments and without interference between adjacent cylindrically shaped segments.

26. A tubular, flexible, self-expandable stent made of nitinol, the stent comprising:

1) a plurality of cylindrically shaped segments which are interconnected,

one of the cylindrically shaped segments being an intermediate cylindrically shaped segment having a proximal end and a distal end,

one of the cylindrically shaped segments being a proximal cylindrically shaped segment having a proximal end and a distal end located adjacent the proximal end of the intermediate cylindrically shaped segment and

one of the cylindrically shaped segments being a distal cylindrically shaped segment having a distal end and a proximal end located adjacent the distal end of the intermediate cylindrically shaped segment,

each cylindrically shaped segment being defined by an undulating pattern of interconnected struts, each strut having a proximal end and a distal end, each strut adjacent a first strut and a second strut, the strut and the first strut interconnected only at their distal ends, the strut and the second strut interconnected only at their proximal ends, and

2) a plurality of interconnecting elements including proximal interconnecting elements and distal interconnecting elements, each interconnecting element having a proximal end and a distal end, the proximal end of the interconnecting element circumferentially and longitudinally offset from the distal end of the interconnecting element, the interconnecting elements shorter in length than the cylindrically shaped segments,

each proximal interconnecting element extending proximally from an interconnected proximal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected distal end of adjacent struts on the proximal cylindrically shaped segment,

each distal interconnecting element extending distally from an interconnected distal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected proximal end of adjacent struts on the distal cylindrically shaped segment,

a minimum length pathway of at least three interconnected circumferentially adjacent struts on the intermediate cylindrically shaped segment extending between the distal ends of the proximal interconnecting elements and the proximal ends of the distal interconnecting elements,

wherein upon expansion of the stent interconnected ends of adjacent struts in the proximal cylindrically shaped segment are circumferentially displaced relative to interconnected ends of adjacent struts in the intermediate cylindrically shaped segment and interconnected ends of adjacent struts in the intermediate cylindrically shaped segment are circumferentially displaced relative to interconnected ends of adjacent struts in the distal cylindrically shaped segment to accommodate longitudinal flexing of the stent substantially within the cylindrically shaped segments without substantial flexing of the interconnecting elements and without interference between adjacent cylindrically shaped segments.

27. The stent of claim 26 wherein each interconnecting element extends from a side of an interconnected end of adjacent struts on one cylindrically shaped segment to a side of an interconnected end of adjacent struts on an adjacent cylindrically shaped segment.

28. The stent of claim 26 wherein circumferentially adjacent interconnecting elements are separated by six struts.

29. The stent of claim 26 wherein there are at least three interconnecting elements extending between any two adjacent cylindrically shaped segments.

30. A tubular, flexible, self-expandable stent comprising:

1) a plurality of cylindrically shaped segments which are interconnected,

one of the cylindrically shaped segments being an intermediate cylindrically shaped segment having a proximal end and a distal end,

one of the cylindrically shaped segments being a proximal cylindrically shaped segment having a proximal end and a distal end located adjacent the proximal end of the intermediate cylindrically shaped segment and

one of the cylindrically shaped segments being a distal cylindrically shaped segment having a distal end and a proximal end located adjacent the distal end of the intermediate cylindrically shaped segment,

each cylindrically shaped segment being defined by an undulating pattern of interconnected struts, each strut having a proximal end and a distal end, each strut adjacent a first strut and a second strut, the strut and the first strut interconnected only at their distal ends, the strut and the second strut interconnected only at their proximal ends, and

2) a plurality of interconnecting elements including proximal interconnecting elements and distal interconnecting elements, each interconnecting element having a proximal end and a distal end, the proximal end of the interconnecting element circumferentially and longitudinally offset from the distal end of the interconnecting element, the interconnecting elements shorter in length than the cylindrically shaped segments,

each proximal interconnecting element extending proximally from an interconnected proximal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected distal end of adjacent struts on the proximal cylindrically shaped segment,

each distal interconnecting element extending distally from an interconnected distal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected proximal end of adjacent struts on the distal cylindrically shaped segment,

the interconnecting elements extending at an oblique angle relative to the longitudinal axis, a minimum length pathway of at least three interconnected circumferentially adjacent struts on the intermediate cylindrically shaped segment extending between the distal ends of the proximal interconnecting elements and the proximal ends of the distal interconnecting elements, at least three interconnecting elements extending between any two adjacent cylindrically shaped segments,

wherein upon expansion of the stent interconnected ends of adjacent struts in the proximal cylindrically shaped segment are displaced circumferentially relative to interconnected ends of adjacent struts in the intermediate cylindrically shaped segment and interconnected ends of adjacent struts in the intermediate cylindrically shaped segment are circumferentially displaced relative to interconnected ends of adjacent struts in the distal cylindrically shaped segment to accommodate longitudinal flexing of the stent substantially within the cylindrically shaped segments and without interference between adjacent cylindrically shaped segments.

31. The stent of claim 30 wherein the direction of the interconnecting elements reverses between adjacent pairs of interconnected segments.

32. The stent of claim 30 wherein circumferentially adjacent interconnecting elements are separated by six struts.

33. The stent of claim 19 wherein the direction of the interconnecting elements reverses between adjacent pairs of interconnected cylindrically shaped segments.

34. The stent of claim 26 wherein the direction of the interconnecting elements reverses between adjacent pairs of interconnected cylindrically shaped segments.

39. A tubular, flexible, self-expandable stent comprising:

1) a plurality of cylindrically shaped segments which are interconnected including

a first cylindrically shaped segment defined by an undulating pattern of interconnected first struts, each first strut having a proximal end and a distal end, first struts which are circumferentially adjacent one another and connected at the proximal ends of the first struts forming first troughs, first struts which are circumferentially adjacent one another and connected at the distal ends of the first struts forming first peaks, the first troughs and the first peaks alternating with one another and circumferentially offset from one another about the first cylindrically shaped segment,

a second cylindrically shaped segment defined by an undulating pattern of interconnected second struts, each second strut having a proximal end and a distal end, second struts which are circumferentially adjacent one another and connected at the proximal ends of the second struts forming second troughs, second struts which are circumferentially adjacent one another and connected at the distal ends of the second struts forming second peaks, the second troughs and the second peaks alternating with one another and circumferentially offset from one another about the second cylindrically shaped segment,

a third cylindrically shaped segment defined by an undulating pattern of interconnected third struts, each third strut having a proximal end and a distal end, third struts which are circumferentially adjacent one another and connected at the proximal ends of the third struts forming third troughs, third struts which are circumferentially adjacent one another and connected at the distal ends of the third struts forming third peaks, the third troughs and the third peaks alternating with one another and circumferentially offset from one another about the third cylindrically shaped segment, and

2) a plurality of first connectors connecting the first cylindrically shaped segment and the second cylindrically shaped segment, each first connector having a first end and a second end circumferentially and longitudinally offset from the first end, each first connector extending from one of the first peaks to one of the second troughs, each first connector extending at an oblique angle relative to the longitudinal axis, first connectors which are adjacent one another separated by six first struts, the first connectors shorter in length than the first and second cylindrically shaped segments,

a plurality of second connectors connecting the second cylindrically shaped segment and the third cylindrically shaped segment, each second connector having a first end and a second end circumferentially and longitudinally offset from the first end, each second connector extending from one of the second peaks to one of the third troughs, each second connector extending at an oblique angle relative to the longitudinal axis, second connectors which are adjacent one another separated by six second struts, the second connectors shorter in length than the second and third cylindrically shaped segments,

the second end of each first connector separated from the first end of a second connector which is nearest to it by at least three second struts,

wherein flexing of the stent occurs substantially in the cylindrically shaped segments.

40. The stent of claim 39 formed of a shape memory metal.

41. The stent of claim 40 formed of nitinol.

42. The stent of claim 39, each first peak having a first side, a second side and a middle portion between the first and second sides, each second trough having a first side, a second side and a middle portion between the first and second sides, each second peak having a first side, a second side and a middle portion between the first and second sides, and each third trough having a first side, a second side and a middle portion between the first and second sides,

wherein each first connector extends from the first side of one of the first peaks to the second side of one of the second troughs and each second connector extends from the first side of one of the second peaks to the second side of one of the third troughs.

43. The stent of claim 39, each first connector having a longitudinal axis and each second connector having a longitudinal axis, the longitudinal axis of each first connector intersecting the longitudinal axis of the second connector nearest to the first connector at an angle, the angle bisected by an imaginary line parallel to the longitudinal axis of the stent.

44. The stent of claim 39 wherein there are at least three first connectors and at least three second connectors.

45. The stent of claim 39 constructed and arranged such that upon expansion of the stent, the first peaks are circumferentially displaced relative to the second troughs and the second peaks are circumferentially displaced relative to the third troughs to accommodate longitudinal flexing of the stent within the cylindrically shaped segments and without interference between adjacent cylindrically shaped segments.

46. The stent of claim 39 wherein the direction of the second connectors is reversed relative to the direction of the first connectors.

47. The stent of claim 39 wherein the first cylindrically shaped segment has a first amplitude characterized by the longitudinal distance between the first peaks and the first troughs and the second cylindrically shaped segment has a second amplitude characterized by the longitudinal distance between the second peaks and the second troughs, the first amplitude different from the second amplitude.

48. The stent of claim 39 wherein the first connectors are longer than the second connectors.

49. A stent having a proximal end and a distal end and a longitudinal axis, the stent comprising:

1) a plurality of undulating cylindrical segments including

a first undulating cylindrical segment comprising a plurality of alternating first peaks and first troughs, the first peaks pointing toward the distal end of the stent, the first troughs pointing toward the proximal end of the stent;

a second undulating cylindrical segment comprising a plurality of alternating second peaks and second troughs, the second peaks pointing toward the distal end of the stent, the second troughs pointing toward the proximal end of the stent;

a third undulating cylindrical segment comprising a plurality of alternating third peaks and third troughs, the third peaks pointing toward the distal end of the stent, the third troughs pointing toward the proximal end of the stent;

2) a plurality of connectors including

a plurality of first connectors connecting the first undulating cylindrical segment and the second undulating cylindrical segment, each first connector having a proximal end and a distal end circumferentially and longitudinally displaced from the proximal end, the proximal end extending from one of the first peaks, the distal end extending from one of the second troughs, the first connectors extending from every third first peak and every third second trough, the first connectors shorter in length than the first undulating cylindrical segment and the second undulating cylindrical segment,

a plurality of second connectors connecting the second undulating cylindrical segment and the third undulating cylindrical segment, each second connector having a proximal end and a distal end circumferentially and longitudinally displaced from the proximal end, the proximal end extending from one of the second peaks, the distal end extending from one of the third troughs, the second connectors extending

from every third second peak and every third third trough, the second connectors shorter in length than the second undulating cylindrical segment and the third undulating cylindrical segment,

each first connector separated from a second connector which is nearest to it by at least one second peak and one second trough,

wherein flexing of the stent occurs substantially in the undulating cylindrical segments.

50. The stent of claim 49 formed of a shape memory metal.

51. The stent of claim 50 formed of nitinol.

52. The stent of claim 49 wherein there are at least three first connectors connecting the first and second undulating cylindrical segments.

53. The stent of claim 49 constructed and arranged such that upon expansion of the stent, peaks of undulating cylindrical segments are circumferentially displaced relative to troughs of adjacent undulating cylindrical segments to accommodate longitudinal flexing of the stent within the cylindrically shaped segments and without interference between adjacent cylindrically shaped segments.

54. The stent of claim 53 wherein the connectors are substantially linear.

55. The stent of claim 54 wherein the connectors extend diagonally relative to the longitudinal axis of the stent.

56. The stent of claim 49 each first peak having a first side, a second side and a middle portion between the first and second sides, each second trough having a first side, a second side and a middle portion between the first and second sides, each second peak having a first side, a second side and a middle portion between the first and second sides, and each third trough having a first side, a second side and a middle portion between the first and second sides,

wherein each first connector extends from the first side of one of the first peaks to the second side of one of the second troughs and each second connector extends from the first side of one of the second peaks to the second side of one of the third troughs.

57. The stent of claim 49, each first connector having a longitudinal axis and each second connector having a longitudinal axis, the longitudinal axis of each first connector intersecting the longitudinal axis of the second connector nearest to the first connector at an angle, the angle bisected by an imaginary line parallel to the longitudinal axis of the stent.

58. The stent of claim 49 wherein the direction of the second connectors is reversed relative to the direction of the first connectors.

59. The stent of claim 49 wherein the first undulating cylindrical segment has a first amplitude characterized by the longitudinal distance between the first peaks and the first troughs and the second undulating cylindrical segment has a second amplitude characterized by the longitudinal distance between the second peaks and the second troughs, the first amplitude different from the second amplitude.

60. The stent of claim 49 wherein the first connectors are characterized by a first length and the second connectors are characterized by a second length, the first length different from the second length.

61. A stent having a proximal end and a distal end, the stent comprising:

1) a plurality of undulating cylindrical segments including

a first undulating cylindrical segment comprising a plurality of alternating first peaks and first troughs, the first peaks pointing toward the distal end of the stent, the first troughs pointing toward the proximal end of the stent;

a second undulating cylindrical segment comprising a plurality of alternating second peaks and second troughs, the second peaks pointing toward the distal end of the stent, the second troughs pointing toward the proximal end of the stent;

a third undulating cylindrical segment comprising a plurality of alternating third peaks and third troughs, the third peaks pointing toward the distal end of the stent, the third troughs pointing toward the proximal end of the stent; and

2) a plurality of connectors including

a plurality of first connectors connecting the first undulating cylindrical segment and the second undulating cylindrical segment, each first connector having a proximal end and a distal end circumferentially and longitudinally displaced from the proximal end, the proximal end extending from one of the first peaks, the distal end extending from one of the second troughs, the first connectors extending from every third first peak and every third second trough, the first connectors shorter in length than the first undulating cylindrical segment and the second undulating cylindrical segment,

a plurality of second connectors connecting the second undulating cylindrical segment and the third undulating cylindrical segment, each second connector having a proximal end and a distal end circumferentially and longitudinally displaced from the proximal end, the proximal end extending from one of the second peaks, the distal end extending from one of the third troughs, the second connectors extending from every third second peak and every third third trough, the second connectors shorter in length than the second undulating cylindrical segment and the third undulating cylindrical segment,

each first connector separated from a second connector which is nearest to it by at least one second peak and one second trough,

wherein upon expansion of the stent the first peaks are circumferentially displaced relative to the second troughs and the second peaks are circumferentially displaced relative to the third troughs to accommodate longitudinal flexing of the stent substantially within the undulating cylindrical segments without substantial flexing of the connectors, without interference between the first and second undulating cylindrical segments and without interference between the second and third undulating cylindrical segments.

62. The stent of claim 19 wherein the interconnecting elements are of a shorter length than the struts.

64. The stent of claim 39 wherein the first connectors are shorter than the second connectors.

65. A stent comprising:

1) a plurality of cylindrically shaped segments which are interconnected,

one of the cylindrically shaped segments being an intermediate cylindrically shaped segment having a proximal end and a distal end,

one of the cylindrically shaped segments being a proximal cylindrically shaped segment having a proximal end and a distal end located adjacent the proximal end of the intermediate cylindrically shaped segment and

one of the cylindrically shaped segments being a distal cylindrically shaped segment having a distal end and a proximal end located adjacent the distal end of the intermediate cylindrically shaped segment,

each cylindrically shaped segment being defined by an undulating pattern of interconnected struts, each strut having a proximal end and a distal end, each strut adjacent a

first strut and a second strut, the strut and the first strut interconnected only at their distal ends, the strut and the second strut interconnected only at their proximal ends, and

2) a plurality of interconnecting elements including proximal interconnecting elements and distal interconnecting elements, each interconnecting element having a proximal end and a distal end, the proximal end of the interconnecting element circumferentially and longitudinally offset from the distal end of the interconnecting element, the interconnecting elements shorter in length than the cylindrically shaped segments,

each proximal interconnecting element extending proximally from an interconnected proximal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected distal end of adjacent struts on the proximal cylindrically shaped segment,

each distal interconnecting element extending distally from an interconnected distal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected proximal end of adjacent struts on the distal cylindrically shaped segment,

the interconnecting elements non-parallel to the longitudinal axis, a minimum length pathway of at least three interconnected circumferentially adjacent struts on the intermediate cylindrically shaped segment extending between the distal ends of the proximal interconnecting elements and the proximal ends of the distal interconnecting elements,

wherein flexing of the stent occurs substantially in the cylindrically shaped segments.

66. The stent of claim 65 wherein circumferentially adjacent interconnecting elements are separated by six struts.

67. A stent comprising:

1) a plurality of cylindrically shaped segments which are interconnected,

one of the cylindrically shaped segments being an intermediate cylindrically shaped segment having a proximal end and a distal end,

one of the cylindrically shaped segments being a proximal cylindrically shaped segment having a proximal end and a distal end located adjacent the proximal end of the intermediate cylindrically shaped segment and

one of the cylindrically shaped segments being a distal cylindrically shaped segment having a distal end and a proximal end located adjacent the distal end of the intermediate cylindrically shaped segment,

each cylindrically shaped segment being defined by an undulating pattern of interconnected struts, each strut having a proximal end and a distal end, each strut adjacent a first strut and a second strut, the strut and the first strut interconnected only at their distal ends, the strut and the second strut interconnected only at their proximal ends, and

2) a plurality of interconnecting elements including proximal interconnecting elements and distal interconnecting elements, each interconnecting element having a proximal end and a distal end, the proximal end of the interconnecting element circumferentially and longitudinally offset from the distal end of the interconnecting element, the interconnecting elements shorter in length than the cylindrically shaped segments,

each proximal interconnecting element extending proximally from an interconnected proximal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected distal end of adjacent struts on the proximal cylindrically shaped segment,

each distal interconnecting element extending distally from an interconnected distal end of adjacent struts on the intermediate cylindrically shaped segment to an interconnected proximal end of adjacent struts on the distal cylindrically shaped segment,

the interconnecting elements non-parallel to the longitudinal axis, a minimum length pathway of at least three interconnected circumferentially adjacent struts on the intermediate

cylindrically shaped segment extending between the distal ends of the proximal interconnecting elements and the proximal ends of the distal interconnecting elements, at least three interconnecting elements extending between any two adjacent cylindrically shaped segments,

wherein upon expansion of the stent interconnected ends of adjacent struts in the proximal cylindrically shaped segment are displaced circumferentially relative to interconnected ends of adjacent struts in the intermediate cylindrically shaped segment and interconnected ends of adjacent struts in the intermediate cylindrically shaped segment are circumferentially displaced relative to interconnected ends of adjacent struts in the distal cylindrically shaped segment to accommodate longitudinal flexing of the stent substantially within the cylindrically shaped segments and without interference between adjacent cylindrically shaped segments.

68. The stent of claim 67 wherein circumferentially adjacent interconnecting elements are separated by six struts.

Pending claims from 10/194,854.

9. A stent comprising:
a plurality of adjacent cylindrical elements defining a first end section, a second end section, and a center section therebetween;
each cylindrical element having constant thickness struts formed in a generally serpentine wave pattern transverse to the longitudinal axis and containing alternating valley portions and peak portions;
a plurality of interconnecting members extending between the adjacent cylindrical elements and connecting the adjacent cylindrical elements to one another; and
wherein the struts in each of two of the first end section, second end section, and center section have a greater mass than the struts of the other section.

10. The stent of claim 9, wherein the stent is formed from a flat piece of material.

11. The stent of claim 9, wherein the stent is formed of a biocompatible material selected from the group consisting of stainless steel, tantalum, super-elastic nickel-titanium alloys, or plastic.

12. The stent of claim 9, wherein the stent is formed from a single piece of tubing.